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Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

Semester I Examinations 2008/2009

Exam Code(s)	4IF121
Exam(s)	B.Sc. in Information Technology
Module Code(s)	CT417
Module(s)	Software Engineering III
Paper No.	1
Repeat Paper	
External Examiner(s)	Prof. John A. Keane
Internal Examiner(s)	Prof. G. Lyons Dr. O. Molloy Dr. S. Flynn

Instructions: Candidates should attempt four questions, two questions from each section.
Please use separate answer books for each section.
All questions carry equal marks

Duration	3 hrs
No. of Answer Books	2

Requirements:
Handout
MCQ
Statistical Tables
Graph Paper
Log Graph Paper
Other Material

No. of Pages	6
Department(s)	Information Technology

SECTION A

1. (a) List and Describe the main processes involved in Project Integration Management.

(5)

(b) Describe two of the following methods of Project Selection:

- Focusing on broad organizational needs
- Categorizing information technology projects
- Performing net present value or other financial analyses
- Using a weighted scoring model

(5)

(c) Copy the above table into your answer books and calculate the Net Present Value, Return on Investment (ROI) and Payback Period of a project using the information given.

Discount Rate: 10%					
	Year 0	Year 1	Year 2	Year 3	Total
Costs	100,000	5,000	5,000	5,000	
Discount Factor	1.0	.90	.83	.75	
Discounted Costs					
Benefits	0	50,000	50,000	50,000	
Discount Factor	1.0	.90	.83	.75	
Discounted Benefits					
NPV					
ROI					

(15)

2. (a) Describe the main processes involved in Project Cost Management.

(5)

(b) Explain how Function Point Analysis works and how it would be used in creating a *Bottom-Up* estimate for a software system.

(5)

(c) Suppose that you are asked to perform an analysis on a task (*Requirements Analysis*) that was initially supposed to take 1 month and cost €10,000. 1 month after commencement the task is only 50% complete and has so far cost €15,000. The original budget for the project was €100,000 and it was due to be completed in 12 months. Using Earned Value Analysis, calculate the following for the *Requirements Analysis* task:

- **Earned Value**
- **Cost Variance**
- **Schedule Variance**
- **Cost Performance Index**
- **Schedule Performance Index**

Based on these calculations and given the other project information, calculate the following for *the project:*

- **Estimated Cost at Completion**
- **Estimated Time to Complete**

(15)

3. (a) Explain the different kinds of dependency that can exist between tasks in a project.

(5)

(b) Explain how a Tracking Gannt chart is used to monitor progress on a project.

(5)

(c) You have been asked to take over the management of a project. It is a flagship project for the company where success would reflect well on all involved. However senior management have noticed that tasks are slipping and there are questions being raised regarding performance and motivation of some members of the project team. Explain how you might use Herzbergs Hygiene Factors and Motivators to guide your efforts to turn around the team (and the project).

(15)

4. (a) A university is considering the implementation of an online exams system due to ever increasing student numbers, the long corrections process and the high administrative overhead. It has become increasingly difficult to schedule the huge variety of exams across various locations while accommodating the different combinations that each student might take. Ease of access for disabled students is also an issue. The teaching staff are cautiously welcoming of the initiative, but are fearful that it will restrict the types of questions that can be asked in an online format. Perform a stakeholder analysis for the main stakeholders that you think are relevant to the project.

(10)

(b) Explain how Stakeholder Analysis helps in the formulation of a Communications Plan for a project.

(5)

(c) You have been asked to perform the Risk Analysis for the project described in part (a) of this question. Describe the activities you will need to perform as part of the Risk Management Process.

(5)

SECTION B

5. (a) Crosby defines quality as “zero defects”. Comment on the usefulness of this definition in the context of software. (7)

   (b) The Shewhart (DPCA) model is used for continuous process improvement and consists of four steps: plan, do, check, act. Show how the Shewhart model forms the basis for Software Process Improvement (SPI). (8)

   (c) Two aspects of a QMS are (i) tools, procedures and techniques, (ii) people. As a newly appointed Quality Manager in an organisation, what steps would you take to avoid resistance to a process improvement programme. (10)

6. (a) Many aspects of software products, projects and processes can be measured. Describe how the GQM approach can be used to identify appropriate metrics. (6)

   (b) Using the GQM approach, suggest appropriate metrics for the following situations:
   - you are a *senior manager*, and your goal is to reduce the number of errors/defects reported by customers
   - you are a *test manager*, and your goal is to improve the effectiveness of the testing process

   State clearly any assumptions you make. (10)

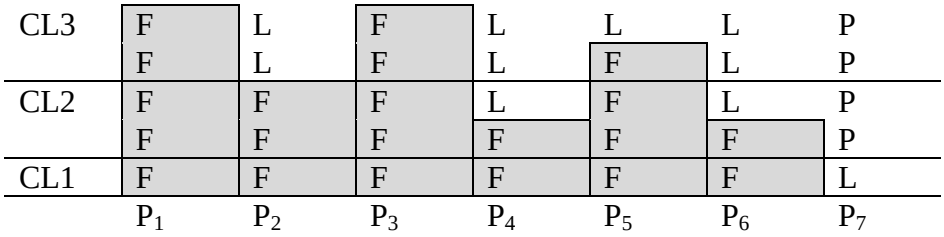
   (c) What are the desirable properties of a good metric? Show how the metrics you proposed in (b) satisfy these principles. (9)

7. (a) Suggest reasons why a software inspections programme may fail. (8)

   (b) You have recently joined the QA team in a large software organisation. You have been asked to initiate a programme of inspections, as part of an overall quality improvement initiative. What steps would you take to avoid the reasons for failure you identified in part (a)? (8)

   (c) One year on, you have been tracking the defect density in a series of similar products, so that you can monitor the effectiveness of the inspection programme. Over time, you notice that the defect density decreases. Suggest reasons for the falling defect density. (9)

8. Consider the following diagram and answer the questions below:



where P_1 to P_7 are as follows:

P_1	Requirements Elicitation
P_2	Risk Management
P_3	Project Management
P_4	Software Requirements Analysis
P_5	Software Design
P_6	Configuration Management
P_7	Quality Management

(a) The ISO15504 (SPICE) model has two dimensions. Describe the two dimensions and how they work together. You may reference the diagram provided. (7)

(b) You are Quality Manager in a small software organisation. Following a focussed quality assessment by an external consultant using the ISO15504 model, you have been given the results in the above diagram. Give an interpretation of this diagram, suitable for the director of the company. (10)

(c) Based on the diagram, and stating clearly any assumptions you make, identify and justify potential areas for process improvement. (8)